

REMARKS

Claims 1 and 3-27 remain herein. Claim 2 is cancelled hereby.

Attached hereto, pursuant to 37 C.F.R. 1.121(c)(1)(ii), is a marked-up version of claims 1 and 7 showing the changes being made.

The Applicants thank Examiner Sorkin for the courtesies extended during the interview conducted on June 6, 2001. The substance of the discussion during that interview is incorporated in the following remarks.

Claims 1, 7 and 14-21 were rejected under 35 U.S.C. §102(e) over U.S. Patent No. 6,099,986 (Gauthier '986).

With particular reference to claim 7, it is respectfully noted that Gauthier '986 fails to disclose or suggest a battery in which the tabs function as current fuses during discharge of the battery, and fails to disclose or suggest a battery which would inherently satisfy this condition. The Office Action contains a statement that "all materials have an inherent capability of fusing if enough current is applied" (Office Action, pg. 3, lns. 3-4). This statement, however, does not address whether the battery of Gauthier '986 would be capable of providing sufficient current to cause any tabs therein to fuse. In fact, in all lithium secondary batteries in the prior art, the batteries do not provide sufficient current to cause the tabs within the battery to fuse. That is, even if a short circuit condition arises, known lithium secondary batteries will run out of capacity long before any of the tabs therein melt or otherwise provide a fusing function. This is the reason that the prior art provides numerous examples of safety mechanisms, e.g., pressure release mechanisms to avoid explosion when a battery short circuits (and creates the possibility that the battery will heat up to cause the electrolyte to vaporize). The invention recited in claim 7 provides a novel approach by dimensioning tabs such that a short circuit condition during discharge of the battery can give rise to a current at which the tabs will perform a fusing function.

Claim 1 is amended as set forth above to recite minimum cross-sectional areas for three metals out of which the tabs can be constructed. Gauthier '986 fails to disclose or suggest a battery having each of the features recited in claim 1. Gauthier '986 discloses an embodiment of an electrochemical cell 50 which includes an anode contact 56 and a cathode contact 55, in which a thermal conductor 52 is attached to each of the anode and cathode contacts 56 and 55 and includes an electrical connection lead 54. This embodiment fails to include a plurality of tabs connected to each of positive and negative electrodes. Furthermore, as shown in Fig. 1C,

a plurality of thermal conductors 63 is provided. Electrically resistive material is provided within the device, as disclosed in column 3, lines 35-67. Accordingly, Gauthier '986 would not motivate an ordinary artisan to attempt to solve the problems associated with heat generated within a lithium secondary battery.

Gauthier '986 further discloses a cell as shown in Fig. 3. In this cell, current collection is achieved through contacts formed on edges of the cathode and anode films, as described in Gauthier '986, column 4, lines 44-58. Accordingly, the lithium secondary battery recited in claim 1 is completely different from the cell disclosed in Gauthier '986, which fails to disclose use of tabs as a current collecting means.

The Office Action apparently sets forth a position that the claims cover batteries in which only a single tab is connected to the positive electrode and a single tab is connected to the negative electrode. However, claim 1 recites "at least a plurality of tabs connected to each of the positive and negative electrodes" indicating that at least two tabs are connected to the positive electrode and at least two tabs are connected to the negative electrode. For the reasons discussed above, Gauthier '986 fails to disclose or suggest a battery having these properties recited in claim 1.

Reconsideration and withdrawal of this rejection are requested.

Claims 2-6, 8-13 and 22-27 were rejected under 35 U.S.C. §103(a) over Gauthier '986.

Claim 2 has been cancelled as set forth above. Claims 3-6, 8-13 and 22-27 each ultimately depend from either claim 1 or claim 7, and therefore are patentable over Gauthier '986 for at least the reasons discussed above in connection with claims 1 and 7.

Reconsideration and withdrawal of this rejection are requested.

Just prior to the June 6, 2001 interview, Examiner Sorkin forwarded to the undersigned a copy of the U.S. Patent No. 6,071,638 (Fradin '638) and asserted that Fradin '638 discloses a cell which includes a first plurality of tabs connected to a positive electrode and a second plurality of tabs connected to a negative electrode. It is respectfully noted that Fradin '638 fails to disclose or suggest a battery in which tabs function as current fuses during discharge of the battery, and fails to disclose or suggest a battery which would inherently satisfy this condition. In addition, Fradin '638 fails to disclose or suggest a battery in which tabs are selected from aluminum tabs having a total cross-sectional area of not less than 0.009 cm², copper tabs having a total cross-sectional area of not less than 0.005 cm² and nickel tabs having a total cross-

sectional area of not less than 0.004 cm². Accordingly, favorable consideration of claims 1 and 7, amended as set forth above, is respectfully requested.

In view of the above, claims 1 and 3-27 are condition for allowance.

If the Examiner believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicant's attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

July 24, 2001

Date



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1. (Twice Amended) A lithium secondary battery, comprising:

an internal electrode body including a positive electrode, a negative electrode, and a separator, the positive electrode and the negative electrode being wound or laminated ~~via a~~ with the separator so that the positive electrode and the negative electrode are ~~not brought~~ prevented by the separator from coming into direct contact with each other;

an organic electrolyte; and

at least a plurality of tabs connected to each of the positive and negative electrodes for current collecting, the tabs having a total cross-sectional area not less than a constant area in accordance with the quality of the material to be used for the tabs so that the tabs connected to each of the positive and negative electrodes may not fuse when at least 100 A current flows through the lithium secondary battery, each of said tabs being selected from among aluminum tabs having a total cross-sectional area of not less than 0.009 cm², copper tabs having a total cross-sectional area of not less than 0.005 cm² and nickel tabs having a total cross-sectional area of not less than 0.004 cm².

7. (Twice Amended) A lithium secondary battery, comprising:

an internal electrode body including a positive electrode, a negative electrode, and a separator, the positive electrode and the negative electrode being wound or laminated ~~via a~~ with the separator so that the positive electrode and the negative electrode are ~~not brought~~ prevented by the separator from coming into direct contact with each other;

an organic electrolyte; and

at least a plurality of tabs connected to each of the positive and negative electrodes for current collecting,

wherein the tabs function as current fuses to become nonconductive in the event that a condition arises during discharge of the battery in which sufficient current to damage one or more components of the battery is provided.